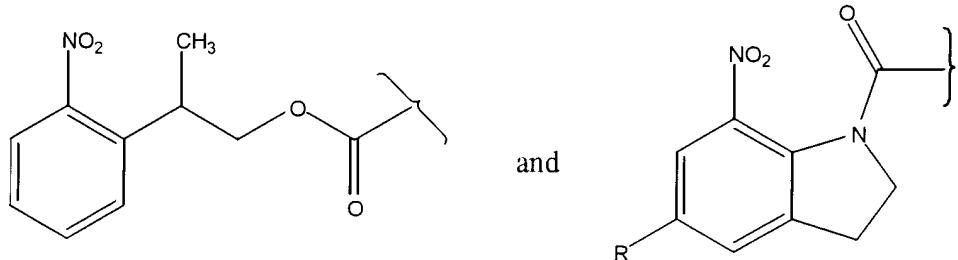
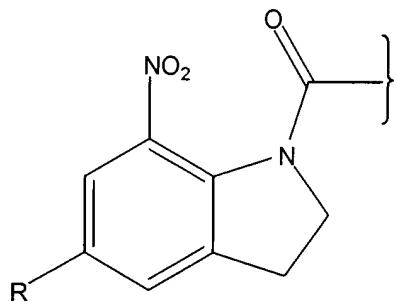


I. Claim Amendments

Claims 1, 5 and 14 have been amended to remove from the list of structures from which Y or Y<sub>1</sub> is selected, photolabile protecting groups having the following structural formulas:



Claims 30, 32 and 34 have been amended to remove from the list of structures from which Y<sub>1</sub> is selected, photolabile protecting groups having the following structural formula:



Claim 7 has been amended to recite “additional molecule” rather than “second molecule.” Claim 7 has been further amended to indicate that Y<sub>1</sub> of the additional molecule is selected from the group of photolabile protecting groups listed in Claim 5 and is the same as or different from Y<sub>1</sub> of the first molecule. In addition, Claim 7 has been amended to indicate that M<sub>1</sub> of the additional molecule is a monomeric building block and is the same as or different from M<sub>1</sub> of the first molecule. Support for this amendment can be found on page 9, lines 23-26 of the specification.

Claim 8, which depends on Claim 7, has been amended to indicate that steps (a) and (b) are repeated. Support for this amendment can be found on page 9, lines 23-26 of the specification.

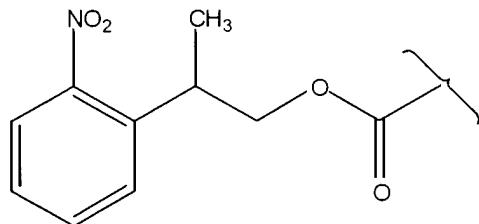
Claim 14 has been amended to recite that M<sub>1</sub> and Y<sub>1</sub> in steps (b), (c) and (e) are the same as or different from each other. Support for the amendment can be found at page 10, line 21 through page 11, line 2 of the specification.

Claim 30 has been amended to indicate that M in the formula M-Y<sub>1</sub> is a monomeric building block, a solid surface or a gel having a reactive site masked by Y<sub>1</sub>. Support for this amendment can be found on page 6, line 27 to page 7, line 4 and page 9, lines 1-6 of the specification. In addition, Claim 30 has been amended to indicate that R is -H, an optionally substituted alkyl group, an optionally substituted alkenyl group, an optionally substituted alkynyl group, an optionally substituted aryl group, or an optionally substituted heteroaromatic group. Support for this amendment can be found on page 6, lines 25-26 of the specification.

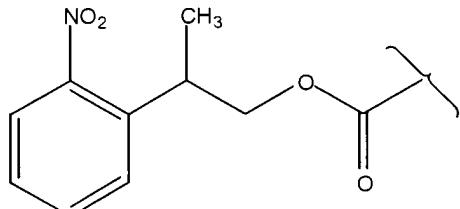
Claims 32 and 34 have been rewritten as independent claims, incorporating all the limitations of Claims 5, 7 and 8 and Claim 14, as amended, respectively.

## II. Rejection of Claims 1-4 Under 35 U.S.C. § 102(b)

Claims 1-4 are rejected under 35 U.S.C. § 102(b) as being anticipated by Pfleiderer, *et al.*, WO 96/18637 A2 (Reference N) or Pfleiderer, *et al.*, U.S. Patent No. 5,763,599 (Reference B; hereinafter the two references are referred to jointly as “Pfleiderer”). The Examiner states that Pfleiderer discloses thymidine, 5’-[2-(2-nitrophenyl)propyl carbonate], which the Examiner believes corresponds to M-Y<sub>1</sub> as claimed in Claims 1-4, where M is a nucleoside and Y<sub>1</sub> has the formula:



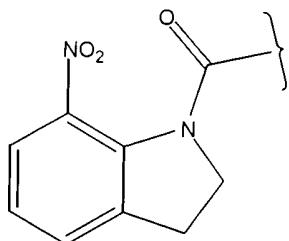
Applicant has amended Claim 1 to remove the Y<sub>1</sub> photolabile protecting group having the following structural formula:



Thus, Claims 1-4, as amended, are not anticipated by Pfleiderer. Therefore, Applicant respectfully requests that the rejection be reconsidered and withdrawn.

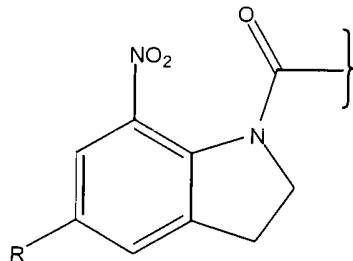
III. Rejection of Claims 1-2 Under 35 U.S.C. § 102(b)

Claims 1-2 are rejected under 35 U.S.C. § 102(b) as being anticipated by Papageorgiou, *et al.*, *J. Am. Chem. Soc.* (1999), 121:6503-6504 (Reference U; hereinafter “Papageorgiou”). The Examiner states that Papageorgiou discloses a glutamate residue modified with a group having the following formula:



in which the benzyl ring is modified with an alkyl substituent in the meta position with respect to the nitro group.

Applicant has amended Claim 1 to remove the Y<sub>1</sub> photolabile protecting group having the following structural formula:



Thus, Claims 1-2, as amended, are not anticipated by Papageorgiou. Therefore, Applicant respectfully requests that the rejection be reconsidered and withdrawn.

IV. Rejection of Claims 1-23 Under 35 U.S.C. § 103(a)

Claims 1-23 are rejected under 35 U.S.C. § 103(a) as being obvious over Pfleiderer in view of Fodor, *et al.*, *Science* (1991) 251: 767-773 (hereinafter “Fodor”) or McGall, *et al.*, U.S. Patent No. 5,412,087 (Reference A; hereinafter “McGall”). The Examiner states that Pfleiderer teaches thymidine, 5'-[2-(2-nitrophenyl) propyl carbonate], which the Examiner concludes corresponds to a compound of the formula M-Y<sub>1</sub> in which M is a nucleoside and Y<sub>1</sub> is 2-(2-nitrophenyl)ethoxycarbonyl. The Examiner states that Pfleiderer teaches that this modified nucleoside can be used in a light directed synthesis of oligonucleotides disclosed by Fodor.

Similarly, the Examiner states that it would have been obvious to combine Pfleiderer and McGall because McGall teaches that nitrobenzyl groups are suitable for use in the methods disclosed therein, and the photosensitive groups disclosed in Pfleiderer are nitrobenzyllic-type compounds. Therefore, the Examiner believes that the invention as a whole is *prima facie* obvious over Pfleiderer in view of Fodor or McGall.

The compounds recited in instant Claims 1-23, as amended herein, do not encompass any of the compounds taught by Pfleiderer. Accordingly, combination of Pfleiderer with Fodor or McGall does not teach or suggest the compositions or methods of the invention as currently claimed. Reconsideration and withdrawal of the rejection are respectfully requested.

V. Rejection of Claims 7-12 and 30-35 Under 35 U.S.C. § 112, Second Paragraph

Claims 7-12 and 30-35 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

The Examiner states that Claim 7, and the claims depending therefrom, are vague and indefinite because the metes and bounds of the phrase “wherein Y<sub>1</sub> and M<sub>1</sub> of the second molecule are selected independent of the first molecule” are vague and indefinite.

Applicant has amended Claim 7 to recite that Y<sub>1</sub> of the additional molecule is selected from the group of photolabile protecting groups listed in Claim 5 and that Y<sub>1</sub> of the additional molecule is the same as or different from Y<sub>1</sub> of the first molecule. In addition, Claim 7 has been amended to indicate that M<sub>1</sub> of the additional molecule is a monomeric building block and is the same as or different from M<sub>1</sub> of the first molecule. Thus, Claim 7, as amended, more distinctly sets forth the metes and bounds of the claimed subject matter.

The Examiner states that Claim 8, and the claims depending therefrom, are vague and indefinite because the metes and bounds of the phrase “molecules represented by the formula M<sub>1</sub>-Y<sub>1</sub>, wherein Y<sub>1</sub> and M<sub>1</sub> for each occurrence are selected independently” are vague and indefinite.

Claim 8 has been amended to eliminate the above phrase and recite that the method comprises repeating steps (a) and (b). Thus, Claim 8, as amended, more distinctly sets forth the metes and bounds of the claimed subject matter.

The Examiner states that Claim 30 is vague and indefinite because the formula M-Y<sub>1</sub> is recited in the claim, but the term "M" is not defined. In addition, the Examiner states that one of the compounds that correspond to Y<sub>1</sub> comprise the term "R", but there is no definition for R in the claim.

Claim 30 has been amended to recite that M in the formula M-Y<sub>1</sub> is a monomeric building block, a solid surface or a gel having a reactive site masked by Y<sub>1</sub>, and to define R as -H, an optionally substituted alkyl group, an optionally substituted alkenyl group, an optionally substituted alkynyl group, an optionally substituted aryl group, or an optionally substituted heteroaromatic group. Thus, Claim 30, as amended, more distinctly sets forth the metes and bounds of the claimed subject matter.

The Examiner states that Claims 32-33 recite various compounds which correspond to Y<sub>1</sub>; however, the Examiner believes that the Y<sub>1</sub> compounds recited in Claim 32 lack antecedent basis.

Claim 32 has been rewritten as an independent claim, incorporating all of the limitations of Claims 5, 7 and 8, as amended, thereby obviating the rejection.

The Examiner states that Claims 34-35 recite various compounds that correspond to Y<sub>1</sub>; however, the Examiner believes that the Y<sub>1</sub> compounds recited in Claim 34 lack antecedent basis.

Claim 34 has been rewritten as an independent claim, incorporating all of the limitations of Claim 14, as amended, thereby obviating the rejection.

In view of the above amendments and remarks, Applicant believes that Claims 7-12 and 30-35 meet the requirements of 35 U.S.C. § 112, second paragraph, and Applicant respectfully requests that the rejection be reconsidered and withdrawn.

## VI. Formal Drawings

Formal Drawings were filed on November 21, 2001. In order to expedite prosecution, a second set of Formal Drawings is enclosed herewith.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned at (978) 341-0036.

Respectfully submitted,

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By Lisa M. Treannie  
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Registration No. 41,368  
Telephone: (978) 341-0036  
Facsimile: (978) 341-0136

Concord, MA 01742-9133

Dated: 8/13/02



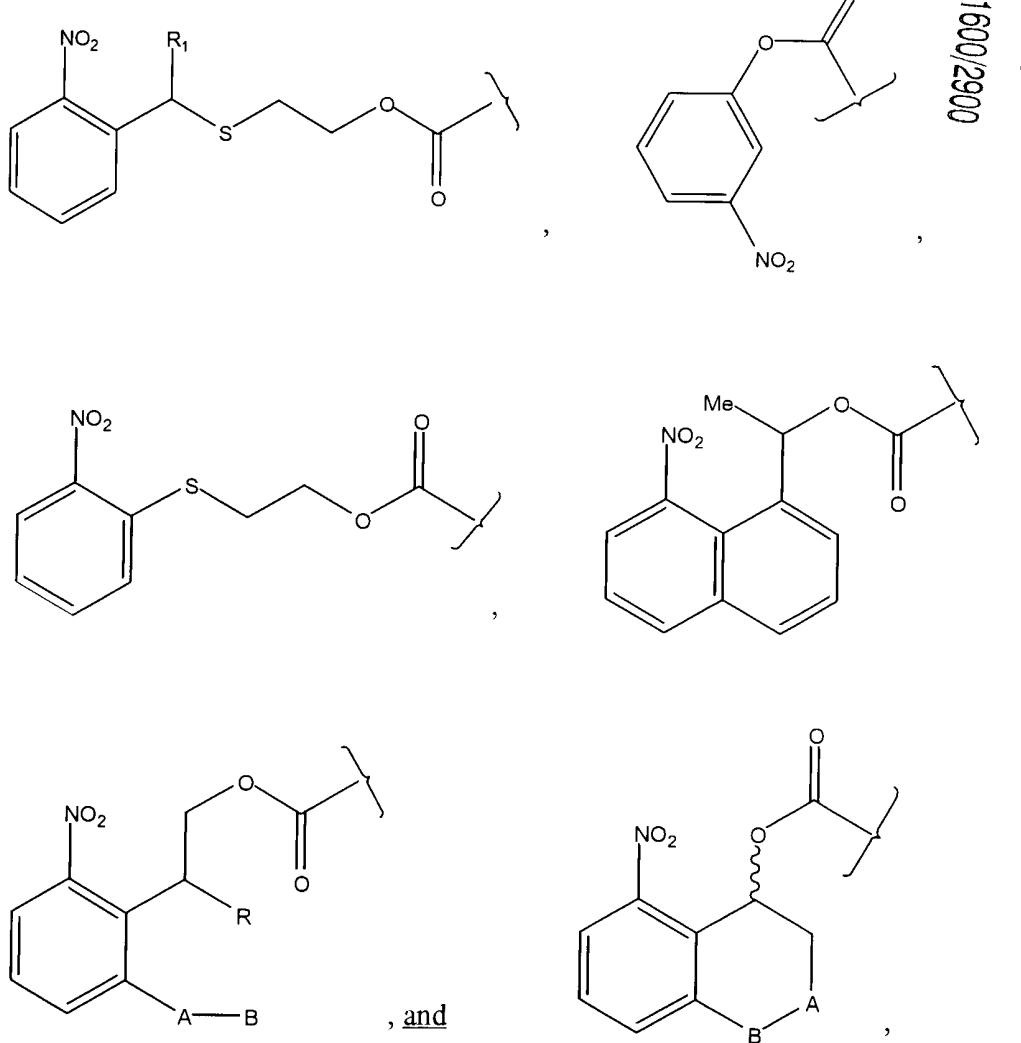
MARKED UP VERSION OF AMENDMENTS

Claim Amendments Under 37 C.F.R. § 1.121(c)(1)(ii)

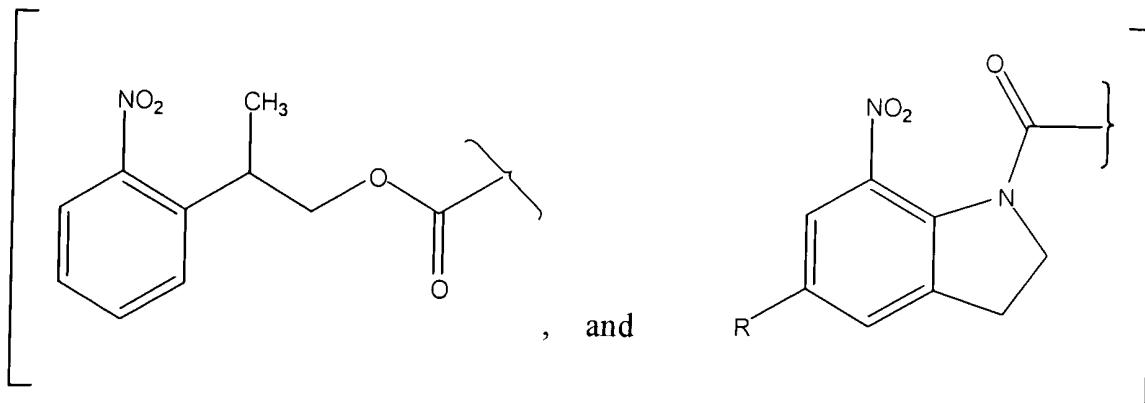
1. (Twice Amended) A compound represented by the formula M-Y, wherein:

M is a monomeric building block, a solid surface or a gel having a reactive site that is masked by Y; and

Y is a photolabile protecting group selected from the group consisting of:



, and



wherein:

the aromatic ring is optionally substituted with an alkoxy group or a methylenedioxy group;

A is O, S, N-alkyl, N-aryl, or  $(CH_2)_n$ ;

n is 0 to about 3;

B is an aprotic, weakly basic group;

R and  $R_1$  are each, independently, -H, an optionally substituted alkyl group, an optionally substituted alkenyl group, an optionally substituted alkynyl [alkynyl] group, an optionally substituted aryl group, or an optionally substituted heteroaromatic group.

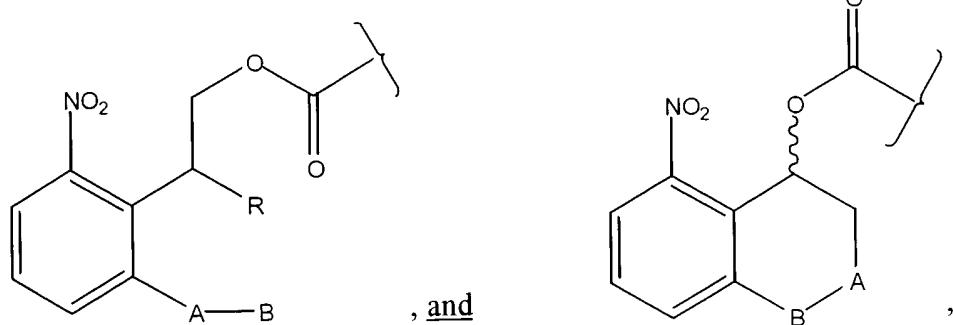
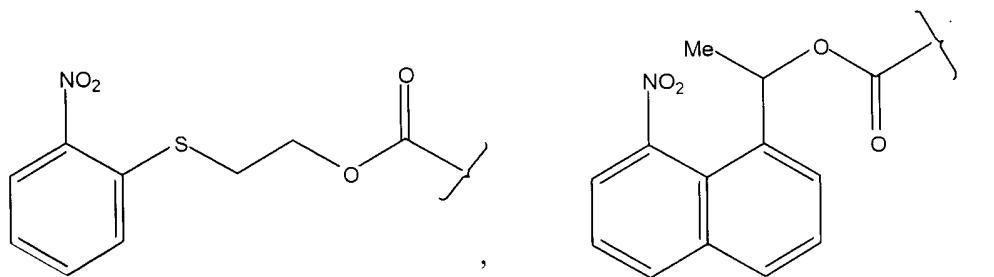
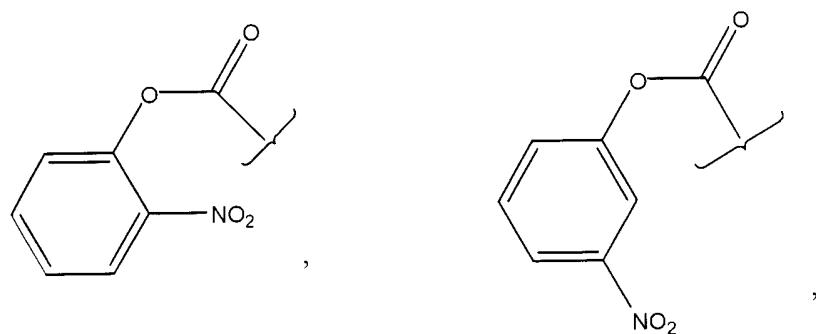
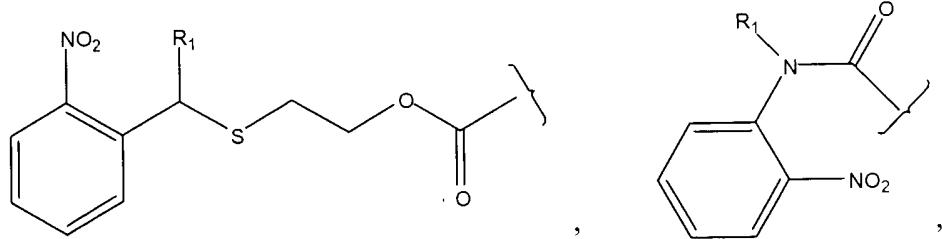
5. (Twice Amended) A method of attaching a molecule with a reactive site to a support comprising the steps of:

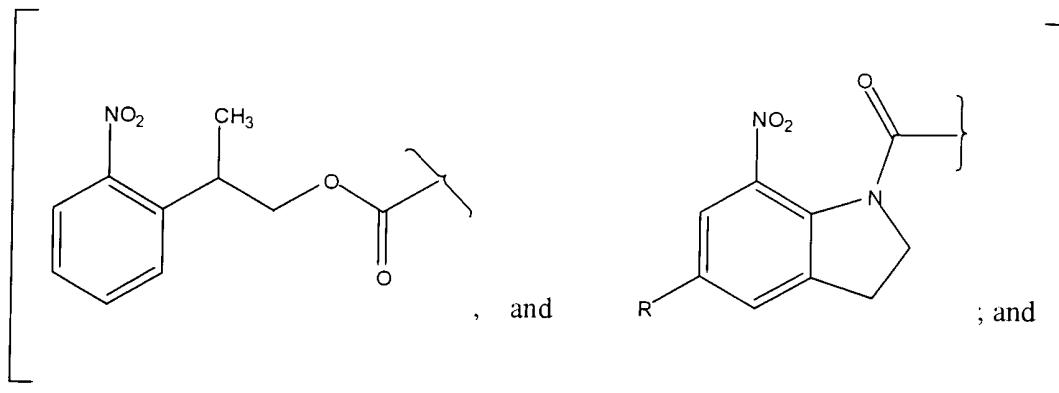
(a) providing a support with a reactive site;

(b) binding a first molecule represented by the formula  $M_1-Y_1$  to the reactive site, wherein:

$M_1$  is a monomeric building block having a reactive site that is masked by  $Y_1$ ;  
and

$Y_1$  is a photolabile protecting group selected from the group consisting of:





wherein:

the aromatic ring is optionally substituted with an alkoxy group or a methylenedioxy group;

A is O, S, N-alkyl, N-aryl, or  $(CH_2)_n$ ;

n is 0 to about 3;

B is an aprotic, weakly basic group;

R and  $R_1$  are each, independently, -H, an optionally substituted alkyl group, an optionally substituted alkenyl group, an optionally substituted alkynyl [alkynyl] group, an optionally substituted aryl group, or an optionally substituted heteroaromatic group; and

(c) removing  $Y_1$  to provide a derivatized support comprising  $M_1$  with an unmasked reactive site immobilized thereon.

7. (Twice Amended) The method of Claim 5, further comprising:

(a) coupling an additional [a second] molecule represented by the formula  $M_1-Y_1$  to the unmasked reactive site, wherein  $Y_1$  of the additional molecule is selected from the group of photolabile protecting groups listed in Claim 5 and is the same as or different from  $Y_1$  of the first molecule, and  $M_1$  of the additional molecule is a monomeric building block and is the same as or different from  $M_1$  of the first molecule [are selected independent of the first molecule], to produce a derivatized support having immobilized thereon a chain of the first and the additional [second] molecules; and

(b) removing  $Y_1$  from the additional [second] molecule to provide a derivatized support with a chain of the first and the additional [second] molecules with an [a second] unmasked reactive site immobilized thereon.

8. (Twice Amended) The method of Claim 7, further comprising repeating steps (a) and (b) [of Claim 7 with a succession of molecules represented by the formula  $M_1-Y_1$ , wherein  $M_1$  for each occurrence are selected independently] to provide a chain of molecules immobilized on the support.

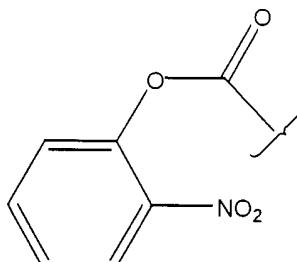
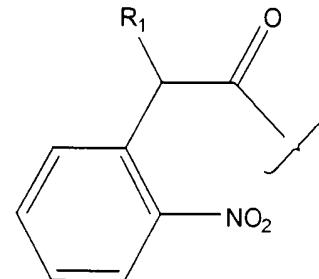
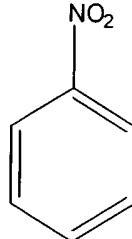
14. (Twice Amended) A method of forming, from component molecules represented by the formula  $M_1-Y_1$ , a plurality of compounds bound to a support, each compound occupying a separate predefined region of the support, said method comprising the steps of:

- (a) activating a first region of the support;
- (b) binding a molecule represented by the formula  $M_1-Y_1$  to the first region;
- (c) repeating steps (a) and (b) on other regions of the support whereby each of said other regions has bound thereto another molecule represented by the formula  $M_1-Y_1$ , wherein  $M_1$  is the same as or different from  $M_1$  of step (b) and  $Y_1$  is the same as or different from  $Y_1$  of step (b);
- (d) removing  $Y_1$  from the  $M_1$  that is bound to one or more regions of the support to provide one or more regions having an unmasked reactive site;
- (e) binding an additional molecule represented by the formula  $M_1-Y_1$  to the said one or more unmasked reactive sites, wherein  $M_1$  is the same as or different from  $M_1$  of steps (b) and (c) and  $Y_1$  is the same as or different from  $Y_1$  of steps (b) and (c); and
- (f) repeating steps (d) and (e) on regions of the support until a desired plurality of compounds is formed from the component molecules represented by formula  $M_1-Y_1$ , each compound occupying separate predefined regions of the support;

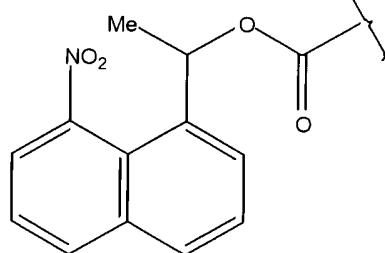
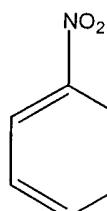
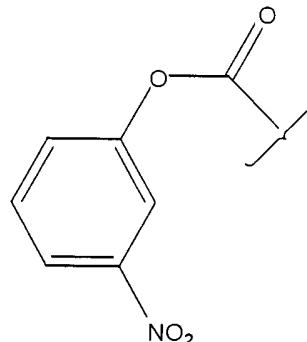
wherein:

$M_1$  [for each occurrence] is a [an independently selected] monomeric building block having a reactive site that is masked by  $Y_1$ ; and

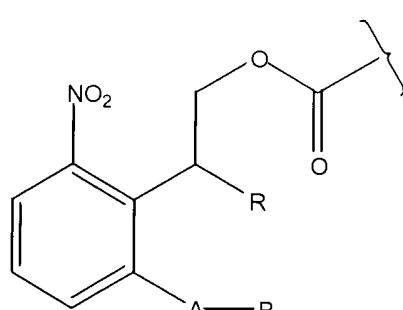
$Y_1$  [for each occurrence] is a photolabile protecting group [that is independently] selected from the group consisting of:



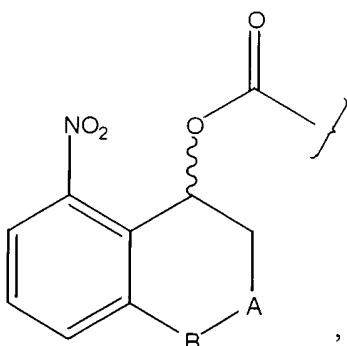
,



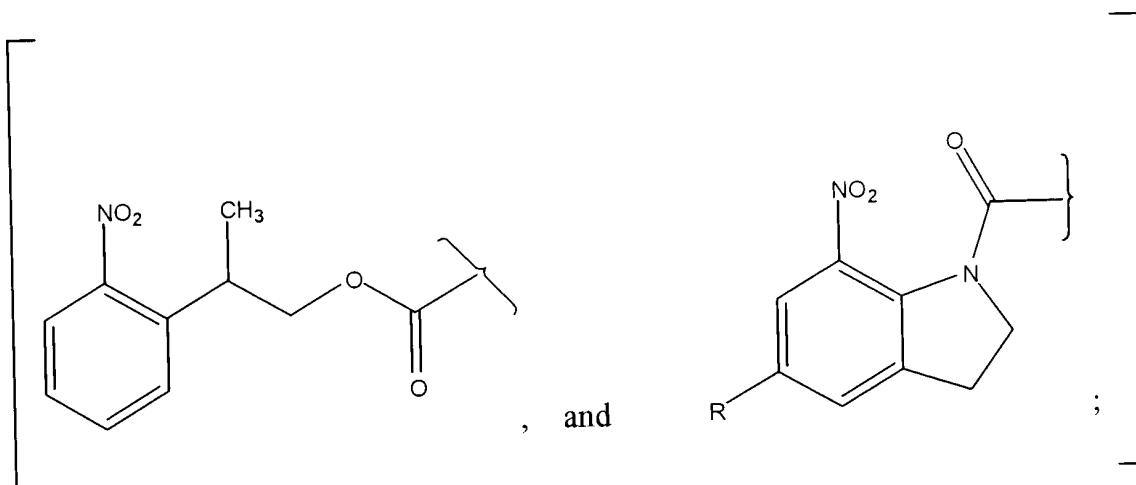
,



, and



,



wherein:

the aromatic ring is optionally substituted with an alkoxy group or a methylenedioxy group;

A is O, S, N-alkyl, N-aryl, or  $(CH_2)_n$ ;

n is 0 to about 3;

B is an aprotic, weakly basic group; and

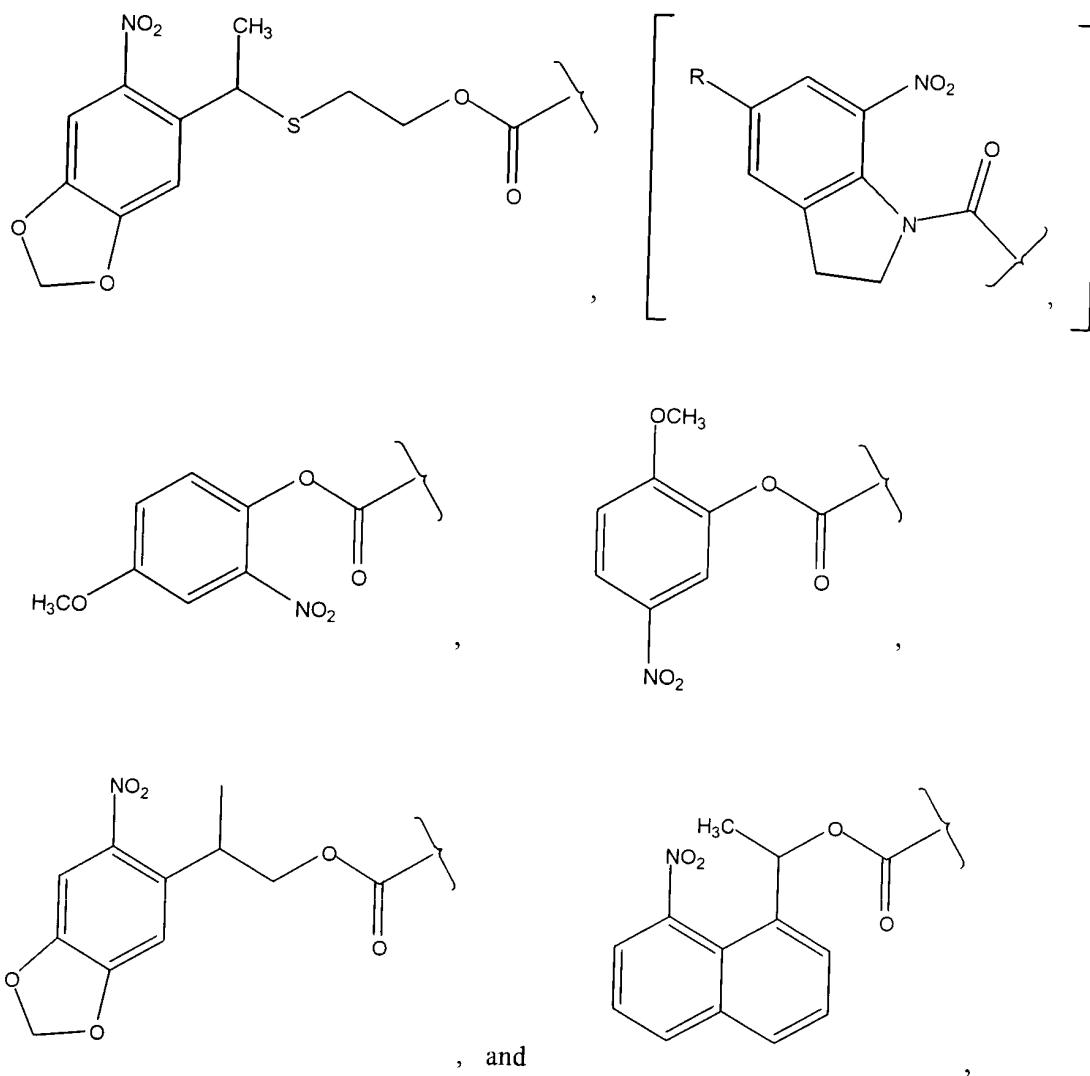
R and  $R_1$  are each, independently, -H, an optionally substituted alkyl group, an optionally substituted alkenyl group, an optionally substituted alkynyl group, an optionally substituted aryl group, or an optionally substituted heteroaromatic group[; and

(f) repeating steps (d) and (e) on regions of the support until a desired plurality of compounds is formed from the component molecules represented by formula  $M_1-Y_1$ , each compound occupying separate predefined regions of the support].

30. (Amended) A compound represented by the formula  $M-Y_1$ , wherein:

M is a monomeric building block, a solid surface or a gel having a reactive site that is masked by  $Y_1$ ; and

$Y_1$  is selected from [form] the group consisting of:



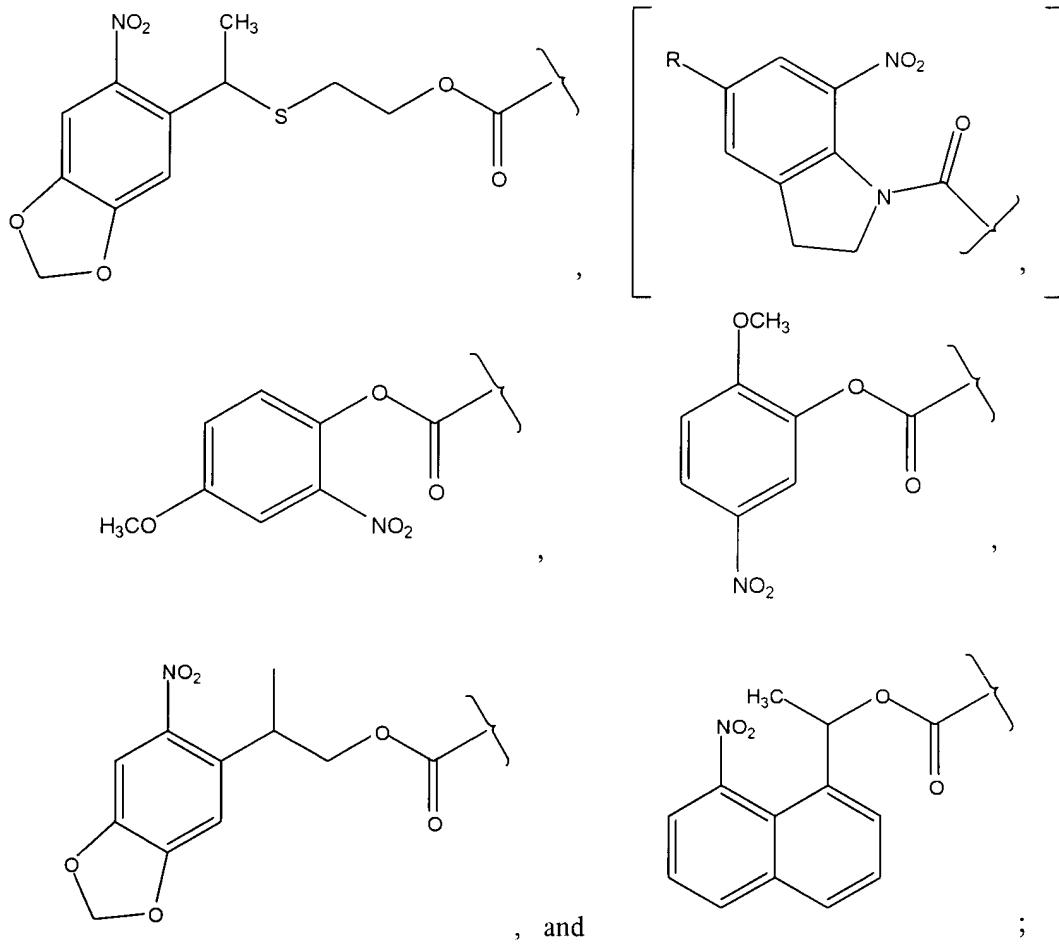
wherein R is -H, an optionally substituted alkyl group, an optionally substituted alkenyl group, an optionally substituted alkynyl group, an optionally substituted aryl group, or an optionally substituted heteroaromatic group.

32. (Amended) [The method of Claim 8, wherein] A method of attaching a molecule with a reactive site to a support comprising the steps of:

- providing a support with a reactive site;
- binding a first molecule represented by the formula  $\text{M}_1\text{-Y}_1$  to the reactive site, wherein:

M<sub>1</sub> is a monomeric building block having a reactive site that is masked by Y<sub>1</sub>; and

Y<sub>1</sub> [for each occurrence is, independently,] is a photolabile protecting group selected from the group consisting of:



wherein:

R is -H, an optionally substituted alkyl group, an optionally substituted alkenyl group, an optionally substituted alkynyl group, an optionally substituted aryl group, or an optionally substituted heteroaromatic group;

- (c) removing Y<sub>1</sub> to provide a derivatized support comprising M<sub>1</sub> with an unmasked reactive site immobilized thereon;
- (d) coupling an additional molecule represented by the formula M<sub>1</sub>-Y<sub>1</sub> to the unmasked reactive site, wherein Y<sub>1</sub> of the additional molecule is selected from the group of

photolabile protecting groups listed in step (b) and is the same as or different from  $Y_1$  of the first molecule, and  $M_1$  of the additional molecule is a monomeric building block and is the same as or different from  $M_1$  of the first molecule, to produce a derivatized support having immobilized thereon a chain of the first and the additional molecules;

- (e) removing  $Y_1$  from the additional molecule to provide a derivatized support with a chain of the first and the additional molecules with an unmasked reactive site immobilized thereon; and
- (f) repeating steps (d) and (e), to provide a chain of molecules immobilized on the support.

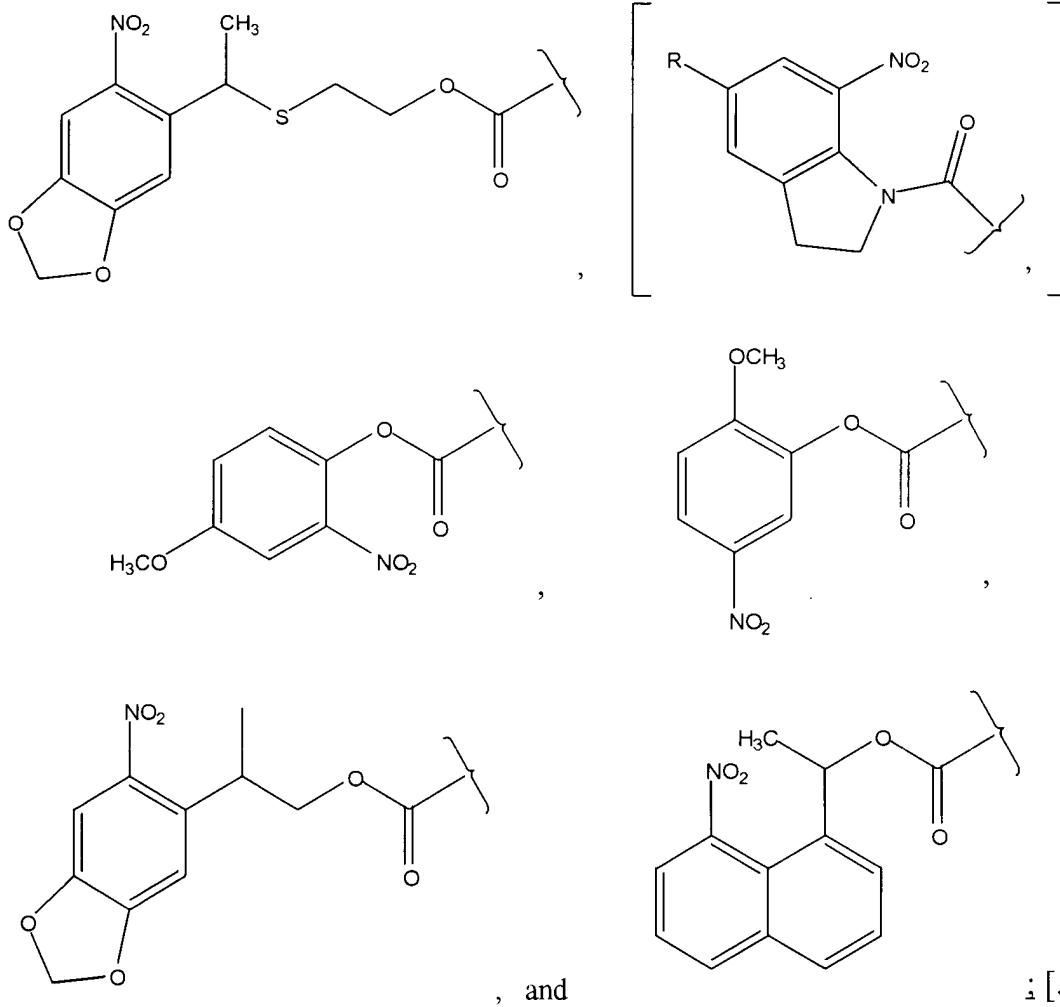
34. (Amended) [The method of Claim 14, wherein] A method of forming, from component molecules represented by the formula  $M_1-Y_1$ , a plurality of compounds bound to a support, each compound occupying a separate predefined region of the support, said method comprising the steps of:

- (a) activating a first region of the support;
- (b) binding a molecule represented by the formula  $M_1-Y_1$  to the first region;
- (c) repeating steps (a) and (b) on other regions of the support whereby each of said other regions has bound thereto a molecule represented by the formula  $M_1-Y_1$ , wherein  $M_1$  is the same as or different from  $M_1$  of step (b) and  $Y_1$  is the same as or different from  $Y_1$  of step (b);
- (d) removing  $Y_1$  from the  $M_1$  that is bound to one or more regions of the support to provide one or more regions having an unmasked reactive site;
- (e) binding an additional molecule represented by the formula  $M_1-Y_1$  to the said one or more unmasked reactive sites, wherein  $M_1$  is the same as or different from  $M_1$  of steps (b) and (c) and  $Y_1$  is the same as or different from  $Y_1$  of steps (b) and (c); and
- (f) repeating steps (d) and (e) on regions of the support until a desired plurality of compounds is formed from the component molecules represented by formula  $M_1-Y_1$ , each compound occupying separate predefined regions of the support;

wherein:

$M_1$  is a monomeric building block having a reactive site that is masked by  $Y_1$ ; and

$Y_1$  [for each occurrence] is a photolabile protecting group [, independently,] selected from the group consisting of:



wherein:

$R$  is -H, an optionally substituted alkyl group, an optionally substituted alkenyl group, an optionally substituted alkynyl group, an optionally substituted aryl group, or an optionally substituted heteroaromatic group.